Claims

1. A process for forming a coating of an encapsulated electrophoretic medium on a conductive portion of a substrate, the process comprising:

dispersing in a fluid a plurality of capsules each comprising a capsule wall, a suspending fluid encapsulated within the capsule wall and a plurality of electrically charged particles suspended in the suspending fluid and capable of moving therethrough on application of an electric field to the capsule;

contacting the conductive portion of the substrate with the fluid; and

applying a potential difference between the conductive portion of the substrate and a counter-electrode in electrical contact with the fluid, thereby causing capsules to be deposited upon the conductive the portion of the substrate.

2. A process according to claim 1 wherein the conductive portion of the substrate comprises at least one electrode, and the potential difference is applied to the at least one electrode, thereby causing capsules to be deposited upon the at least one electrode.

3. A process according to claim 2 wherein the substrate bears at least first and second electrodes and the potential difference is applied to the first electrode, thereby causing capsules to be deposited upon the first electrode but not on the second electrode, the process further comprising:

removing the substrate from the fluid;

dispersing in a second fluid a plurality of second capsules each comprising a capsule wall, a suspending fluid encapsulated within the capsule wall and a plurality of electrically charged particles suspended in the suspending fluid and capable of moving therethrough on application of an electric field to the capsule, the second capsules being capable of displaying at least one optical characteristic differing from the optical characteristics displayed by the capsules deposited on the first electrode;

contacting the second electrode with the second fluid; and

applying a potential difference between the second electrode and a counter-electrode in electrical contact with the second fluid, thereby causing the second capsules to be deposited upon the second electrode but not upon the first electrode.

4. A process according to claim 3 wherein the substrate bears at least first, second and third electrodes , the process further comprising:

removing the substrate from the second fluid;

dispersing in a third fluid a plurality of third capsules each comprising a capsule wall, a suspending fluid encapsulated within the capsule wall and a plurality of electrically charged particles suspended in the suspending fluid and capable of moving therethrough on application of an electric field to the capsule, the third capsules being capable of displaying at least one optical characteristic differing from the optical characteristics displayed by the capsules deposited on the first and second electrodes;

contacting the third electrode with the third fluid; and

applying a potential difference between the third electrode and a counter-electrode in electrical contact with the third fluid, thereby causing the third capsules to be deposited upon the third electrode but not upon the first and second electrodes.

5. A process according to claim 4 wherein the first, second and third capsules are each capable of displaying one of red, green and blue optical characteristics.

6. A process according to claim 4 wherein the first, second and third capsules are each capable of displaying one of yellow, cyan and magenta optical characteristics.

7. A process according to claim 1 further comprising depositing a polymeric binder on the substrate.

8. A process according to claim 7 wherein the polymeric binder is deposited at the same time as the capsules.

9. A process according to claim 8 wherein the fluid comprises a polymeric latex which is deposited at the same time as the capsules to form a polymeric binder surrounding the capsules.

10. A process according to claim 9 wherein the polymeric latex comprises a polyurethane latex.

11. A process according to claim 1 further comprising depositing a lamination adhesive on the substrate.

12. A process according to claim 11 wherein the lamination adhesive is deposited on the substrate after deposition of the capsules thereon.

13. A process according to claim 11 wherein a conductive portion of the substrate is contacted with a fluid containing the lamination adhesive and a potential difference is applied between the conductive portion of the substrate and a counter-electrode in electrical contact with the fluid containing the lamination adhesive, thereby causing the lamination adhesive to be deposited upon the conductive portion of the substrate.

14. A process according to claim 1 wherein the fluid is an aqueous fluid.

15. A process according to claim 1 wherein the fluid contains a buffer.

16. A process according to claim 1 wherein the fluid/capsule mixture has a conductivity of at least about 10 μS/cm.

17. A process according to claim 1 wherein more than one layer of capsules are deposited on the conductive portion of the substrate, and after removal of the substrate from the fluid, the substrate is washed to remove some of the deposited capsules, thereby leaving substantially a monolayer of capsules on the conductive portion of the substrate.

18. A process according to claim 1 wherein the conductive portion of the substrate on which the capsules are deposited is non-planar.

19. A process according to claim 18 wherein the portion of the substrate on which the capsules are deposited is curved in both dimensions.

20. A process according to claim 1 wherein the contacting of the fluid with the conductive portion of the substrate is effected by immersing at least the conductive portion of the substrate in the fluid.

21. A process according to claim 1 wherein the contacting of the fluid with the conductive portion of the substrate is effected by coating at least the conductive portion of the substrate with the fluid.

22. A process according to claim 21 wherein at least the conductive portion of the substrate is slot coated with the fluid.

23. A process according to claim 22 wherein the substrate comprises a conductive layer and the potential difference is applied between the conductive layer of the substrate and an electrode provided on the slot coating head.

24. A process according to claim 21 wherein the fluid further comprises a polymeric binder.

25. A process according to claim 24 wherein at least part of the binder is uncharged in the fluid.

26. A process according to claim 25 wherein the binder comprises a mixture of charged and uncharged particles in the fluid.

27. A process according to claim 24 wherein the polymeric binder comprises a soluble polymer.

28. A process according to claim 1 wherein the substrate is provided with a conductive layer the conductivity of which varies with radiation exposure, a first portion of the conductive layer is exposed to radiation but a second portion is not, and a potential is applied to the conductive layer while the substrate is in contact with the fluid, thereby causing capsules to be deposited upon one of the first and second portions of the conductive layer but not upon the other.

29. A process according to claim 1 wherein the substrate is provided with a conductive layer, a first portion of which is covered with an insulating layer but a second portion is not, and a potential is applied to the conductive layer while the substrate is in contact with the fluid, thereby causing capsules to be deposited upon the second portion of the conductive layer but not upon the first.

30. A process according to claim 29 wherein the insulating layer is provided by covering the conductive layer with a photoresist, imagewise exposing the photoresist to radiation, and removing the photoresist from the second portion of the conductive layer.